

WHAT IS CLAIMED IS:

1. A position detection apparatus for detecting a position of an object surface in a direction normal thereto, comprising:

5 at least two detection sections;

a selection section for selecting at least one detection section from said at least two detection sections; and

10 a measurement device for measuring the position of the object surface in the direction normal thereto using said detection section selected by said selection section.

15 2. The apparatus according to claim 1, wherein each of said at least two detection sections has an electrode, and

said measurement device applies an electrical signal containing an AC component to said electrode of the selected detection section to measure a distance between said electrode and the object surface.

20 3. The apparatus according to claim 2, wherein said electrodes of said at least two detection sections oppose different portions of the object surface.

4. The apparatus according to claim 2, wherein said electrodes of said at least two detection sections are  
25 in one plane.

5. The apparatus according to claim 2, wherein said

electrodes of said at least two detection sections are concentric with each other.

6. The apparatus according to claim 2, wherein said selection section alternatively selects one detection  
5 section from said at least two detection sections.

7. The apparatus according to claim 2, wherein said selection section selects at least one detection section such that the number of detection sections to be selected changes.

10 8. The apparatus according to claim 1, wherein said selection section selects at least one detection section in accordance with a shape of the object surface.

9. The apparatus according to claim 1, wherein said apparatus comprises at least two sets of said at least  
15 two detection sections, said selection sections, and said measurement devices, and further comprises an arithmetic section for calculating a tilt of the object surface on the basis of a measurement result by said at least two measurement devices.

20 10. An exposure apparatus having a projecting lens for projecting a pattern onto a substrate, a stage that moves while supporting the substrate, a position detection section for detecting a position of a substrate surface in a direction of an optical axis, and  
25 a control section for controlling the stage on the basis of an output from said position detection section,

said position detection section comprising  
at least two detection sections;

a selection section for selecting at least one  
detection section from said at least two detection  
5 sections; and

a measurement device for measuring a position of  
the substrate in a direction normal thereto using said  
detection section selected by said selection section.

11. The apparatus according to claim 10, wherein each  
10 of said at least two detection sections has an electrode,  
and said measurement device applies an electrical signal  
containing an AC component to said electrode of the  
selected detection section to measure a distance between  
said electrode and the substrate surface.

12. The apparatus according to claim 11, wherein said  
15 electrodes of said at least two detection sections  
oppose different portions of the substrate surface.

13. The apparatus according to claim 11, wherein said  
electrodes of said at least two detection sections are  
20 in one plane.

14. The apparatus according to claim 11, wherein said  
electrodes of said at least two detection sections are  
concentric with each other.

15. The apparatus according to claim 10, wherein said  
25 selection section alternatively selects one detection  
section from said at least two detection sections.

10056294.013102

16. The apparatus according to claim 10, wherein said selection section selects at least one detection section such that the number of detection sections to be selected changes.
- 5 17. The apparatus according to claim 10, wherein said selection section selects at least one detection section in accordance with a shape of the substrate surface.
18. The apparatus according to claim 10, wherein said selection section selects at least one detection section  
10 in accordance with a position of the stage or the substrate.
19. The apparatus according to claim 10, wherein said selection section selects said detection section to be used for measurement so as not to measure the position  
15 of the substrate in the direction normal thereto on a scribing line of the substrate.
20. The apparatus according to claim 10, wherein said selection section determines the number of detection sections for measurement in accordance with the pattern  
20 formed on the substrate.
21. The apparatus according to claim 10, wherein said selection section determines detection sections to be used for measurement to reflect, on the measurement result, a position of an exposure area on the substrate  
25 in the direction normal thereto where high resolving performance is required.

207570"4625007

22. The apparatus according to claim 16, wherein said selection section determines the number of detection sections to be used for measurement to reflect, on the measurement result, a position of an exposure area on the substrate in the direction normal thereto where high resolving performance is required.

23. An exposure apparatus having a projecting lens for projecting a pattern onto a substrate, a stage which moves while supporting the substrate, first and second position detection sections for detecting a position of a substrate surface in a direction of an optical axis, and a control section for controlling a tilt of the stage on the basis of outputs from said first and second position detection sections,

each of said first and second position detection sections comprising

at least two detection sections;

a selection section for selecting at least one detection section from said at least two detection

sections; and

a measurement device for measuring a position of the substrate in a direction normal thereto using said detection section selected by said selection section.

24. The apparatus according to claim 23, wherein each of said at least two detection sections has an electrode, and said measurement device applies an electrical signal

containing an AC component to said electrode of the selected detection section to measure a distance between said electrode and the substrate surface.

25. The apparatus according to claim 24, wherein said  
5 electrodes of said at least two detection sections oppose different portions of the substrate surface.

26. The apparatus according to claim 24, wherein said electrodes of said at least two detection sections are in one plane.

10 27. The apparatus according to claim 23, wherein said selection section alternatively selects one detection section from said at least two detection sections.

28. The apparatus according to claim 23, wherein each of said selection section of said first position  
15 detection section and said selection section of said second position detection section selects a detection section such that both said detection section of said first position detection section and said detection section of said second position detection section, which  
20 are to be used for measurement, are positioned on an inner area of a width of the pattern projected by the projecting lens and a distance between said detection sections is maximized.

29. The apparatus according to claim 28, wherein the  
25 substrate is exposed while projecting slit-shaped light onto the substrate through the projecting lens and

moving the stage.

30. The apparatus according to claim 23, wherein each of said selection section of said first position detection section and said selection section of said second position detection section selects a detection section such that both said detection section of said first position detection section and said detection section of said second position detection section, which are to be used for measurement, are positioned inside a width of the pattern projected by the projecting lens on the substrate and a distance between said detection sections is maximized.

31. The apparatus according to claim 30, wherein the substrate is exposed while projecting slit-shaped light onto the substrate through the projecting lens and moving the stage.

32. A position detection method of detecting a position of an object surface in a direction normal thereto, comprising:

the selection step of selecting at least one detection section from at least two detection sections; and

the measurement step of measuring the position of the object surface in the direction normal thereto using the selected detection section.

33. A method of controlling an exposure apparatus

having a projecting lens for projecting a pattern onto a substrate, a stage which moves while supporting the substrate, a position detection section for detecting a position of a substrate surface in a direction of an optical axis, and a control section for controlling the stage on the basis of an output from said position detection section, comprising:

the selection step of selecting at least one detection section from at least two detection sections;

10 and

the measurement step of measuring a position of the substrate in a direction normal thereto using the selected detection section.

34. A method of controlling an exposure apparatus

15 having a projecting lens for projecting a pattern onto a substrate, a stage which moves while supporting the substrate, first and second position detection sections for detecting a position of a substrate surface in a direction of an optical axis, and a control section for controlling a tilt of the stage, each of said first and second position detection sections comprising at least two detection sections, comprising:

the selection step of selecting at least one detection section from said at least two detection sections of said first position detection section and at least one detection section from said at least two



detection sections of said second position detection section; and

the measurement step of measuring the tilt of the substrate using the selected detection section of said first position detection section and the selected detection section of said second position detection section.

35. A device manufacturing method comprising the steps of:

10 placing a substrate applied with a resist film on a stage of an exposure apparatus;

selecting at least one detection section of at least two detection sections for measuring a position of the substrate in a direction of an optical axis and  
15 measuring the position of the substrate on the stage in the direction of the optical axis using the selected detection section;

controlling the stage in accordance with a measurement result in the measurement step;

20 forming a pattern on the substrate on the stage by exposure; and

developing the substrate.

36. A device manufacturing method comprising the steps of:

25 placing a substrate applied with a resist film on a stage of an exposure apparatus;

selecting at least one detection section from each  
of two position detection sections each having at least  
two detection sections for measuring a position of the  
substrate in a direction of an optical axis and  
5 measuring a tilt of the substrate on the stage using the  
selected detection sections;

controlling the tilt of the stage in accordance  
with a measurement result in the measurement step;

forming a pattern on the substrate on the stage by  
10 exposure; and

developing the substrate.

20161010 14:52:50